

WHAT IS CLAIMED IS:

1                   1.       A method for operating a storage system configured to provide a Write  
2 Once and Read Many (WORM) function, the method comprising:  
3                   receiving a first command at a storage subsystem from a host; and  
4                   storing at least a portion of the first command on a WORM storage device  
5 coupled to the storage subsystem,  
6                   wherein the WORM storage device is used to verify the WORM function of  
7 the storage system.

1                   2.       The method of claim 1, further comprising:  
2                   receiving a second command at the storage subsystem;  
3                   examining the second command using a command filter, the filter being  
4 provided with a predetermined rule for filtering selected types of commands; and  
5                   storing at least a portion of the second command if the second command  
6 satisfies the predetermined rule.

1                   3.       The method of claim 2, wherein the command filter is configured to  
2 filter any command that affects data stored in a storage area of the storage subsystem,  
3 wherein the second command is not stored in the WORM storage device.

1                   4.       The method of claim 3, wherein the command filter is configured to  
2 filter at least commands relating to ERASE, FORMAT, and WRITE operations.

1                   5.       The method of claim 3, wherein the command is a Command  
2 Descriptor Block.

1                   6.       The method of claim 2, wherein the storage subsystem and the storage  
2 system are the same, the method further comprising:  
3                   writing a subsystem configuration file in the WORM storage device whenever  
4 a subsystem configuration setting is changed.

1                   7.       The method of claim 2, wherein the storage subsystem is a disk array  
2 unit having a storage area that is defined as a WORM storage area, wherein the subsystem  
3 configuration file is used to verify that data on a given storage device have not been changed  
4 or to identify a physical address of a logical volume during auditing.

1                   8.       The method of claim 2, wherein the command filter is configured to  
2 filter commands directed to a predetermined storage area in the storage subsystem, the  
3 predetermined storage area being defined as a WORM storage area.

1                   9.       The method of claim 1, wherein at least portions of all commands are  
2 stored in the WORM device.

1                   10.      The method of claim 1, further comprising:  
2 associating a serial number to the first command; and  
3 storing the serial number in the WORM storage device.

1                   11.      The method of claim 10, further comprising:  
2 associating a timestamp to the first command; and  
3 storing the timestamp in the WORM storage device.

1                   12.      The method of claim 10, wherein the WORM storage device includes a  
2 plurality of records representing a plurality of commands received by the storage subsystem,  
3 each of the commands being associated with a serial number, the serial numbers being used  
4 to sort the commands according to a given order prior to performing an audit of the storage  
5 subsystem.

1                   13.      A method for providing a data archival function, comprising:  
2 storing at least portions of commands directed to a storage subsystem in a  
3 Write Once and Read Many (WORM) storage device, the commands being of a type that  
4 affects a content of data stored in a storage area of the storage subsystem; and  
5 associating a serial number to each of the commands, the serial number being  
6 useful for sorting the commands in a given order,  
7 wherein the WORM storage device includes a plurality of command records,  
8 the command records including the at least portions of the commands and the serial numbers,  
9 wherein the command records are useful for verifying whether or not a storage  
10 subsystem has maintain a WORM integrity.

1                   14.      The method of claim 13, wherein the WORM storage device is coupled  
2 to a host computer, the method further comprising:  
3 decoupling the WORM device from the host computer to perform an audit to  
4 verify the WORM integrity of the storage subsystem,

5                    wherein the plurality of command records are sorted prior to performing the  
6      audit using the serial numbers.

1                    15.      The method of claim 13, wherein the commands directed to the storage  
2      subsystems are filtered according to a predetermined rule.

1                    16.      The method of claim 15, wherein the commands are filtered by  
2      examining operation codes associated with the commands or Logical Unit Numbers  
3      associated with the commands.

1                    17.      A method for auditing a storage system, comprising:  
2                    sorting a plurality of records stored in a Write Once and Read Many (WORM)  
3      storage device using serial numbers associated with the records, each record including  
4      information on a command sent to a storage subsystem;  
5                    examining the information on the command for one of the records to retrieve  
6      address of a storage area to which the command was directed;  
7                    obtaining an entry associated with the storage area from a bitmap of a plurality  
8      of storage areas of the storage subsystem; and  
9                    determining whether or not there is an indication of a WORM violation using  
10     the obtained entry.

1                    18.      The method of claim 17, further comprising:  
2                    reporting a result of the determining step to an auditor; and  
3                    updating the entry of the bitmap,  
4                    wherein the information on the command is the command.

1                    19.      The method of claim 17, wherein the WORM storage device is  
2      received from a host computer or the storage subsystem.

1                    20.      An archival system, comprising:  
2                    a controller to handle data requests from a host computer, each data request  
3      including a command;  
4                    a command filter to select commands that satisfy a predetermined filtering  
5      rule;  
6                    a Write Once and Read Many (WORM) storage device to store at least  
7      portions of the commands that have been selected by the command filter; and

8 at least one storage area that has been defined as a WORM storage area for  
9 archiving data.

1 21. The archival system of claim 20, wherein the archival system includes  
2 a storage subsystem and a host.

1 22. The archival system of claim 21, wherein the WORM device is  
2 coupled to the storage subsystem.

1 23. The archival system of claim 20, wherein the archival system is a  
2 storage subsystem.

1 24. The archival system of claim 20, further comprising:  
2 a terminal system including a WORM device reader to read information stored  
3 in the WORM device and a command checker to examine the information read from the  
4 WORM device.

1 25. A computer readable medium comprising a computer program for  
2 verifying an archival function, the computer program comprising:  
3 code for receiving a first command at a storage subsystem from a host;  
4 code for examining the first command using a predetermined rule;  
5 code for storing at least a portion of the first command on a WORM storage  
6 device coupled to the storage subsystem upon determining that the first command satisfies  
7 the predetermined rule;  
8 code for receiving a second command at the storage subsystem from the host;  
9 code for examining the second command using the predetermine rule; and  
10 not storing any portion of the second command upon determining that the  
11 second command does not satisfy the predetermined rule.

1 26. An archival system, comprising:  
2 means for handling data requests from a host computer, each data request  
3 including a command;  
4 means for filtering commands using a predetermine filtering rule to obtain a  
5 selected command;  
6 means for storing the selected command to a Write Once and Read Many  
7 (WORM) storage device; and

8 means for associating a serial number to the selected command that is stored  
9 in the WORM storage device.

1 27. A disk storage system, comprising:  
2 a controller to handle data requests from a host computer, each data request  
3 including a command;  
4 a command filter to select commands that satisfy a predetermined filtering  
5 rule; and  
6 a Write Once and Read Many (WORM) device writer operable to store at least  
7 a portion of the commands that have been selected by the command filter to a WORM  
8 storage device.

1 28. The system of claim 27, wherein the commands are used to verify a  
2 WORM integrity of the WORM storage device.

1 29. The system of claim 27, wherein the commands are used to identify a  
2 physical address of a logical volume.

1 30. The system of claim 27, wherein a physical address associated with a  
2 logical volume is identified by using a configuration table.

1 31. The system of claim 27, wherein subsystem configuration commands  
2 saved in the WORM storage device are examined to validate a WORM integrity of the  
3 system.